

The Road Inventory of John Heinz National Wildlife Refuge Philadelphia, PA



Prepared By:
Federal Highway Administration
Central Federal Lands Highway Division
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INTRODUCTION

The Transportation Equity Act for the 21st Century (Public Law 105-178) created the Refuge Roads Program. Refuge roads are those public roads that provide access to or within a unit of the National Wildlife Refuge System and for which title and maintenance responsibility is vested in the United States Government. Funds from the Highway Trust Fund are available for refuge roads and can be used by the station to pay the cost of:

- (a) Maintenance and improvements of refuge roads.
- (b) Maintenance and improvements of:
 - (1) Adjacent vehicle parking areas
 - (2) Provision for pedestrians and bicycles and
 - (3) Construction and reconstruction of roadside rest areas that are located in or adjacent to wildlife refuges
- (c) Administrative costs associated with such maintenance and improvements.

The funds available for refuge roads are to be disbursed based on the relative needs of the various refuges in the National Wildlife Refuge System, and taking into consideration:

- (a) The comprehensive conservation plan for each refuge;
- (b) The need for access as identified through land use planning; and
- (c) The impact of land use planning on existing transportation facilities.

To determine the relative needs of the U.S. Fish and Wildlife Service, the Federal Highway Administration (FHWA) was asked to inventory all public access roads and parking lots and provide a condition assessment of each. In 2008 the inventory was expanded to include administrative (service use only) roads and parking lots. An FHWA representative meets with refuge personnel to identify route segments and assign route numbers and functional classifications (See Appendix) for each route. All roads and parking lots are mapped using Trimble GPS units and visually assessed for condition using the RSL method of evaluation developed at Utah State University (See Appendix). Culverts, Gates, Guardrails and Low Water Crossings are also mapped and inspected for any obvious defects.

An estimate is provided, in year 2008 dollars, based on the condition determined by the rating system. Estimates are based upon data and location factors from the 2008 RS Means Heavy Construction Cost Data 22nd Annual Edition. Cost estimates should be evaluated on a case-by-case basis when being used for programming purposes.

Native Surfaced roads and parking lots already inventoried will not be re-inventoried and will not appear individually in report chapters 5, 6 and 8. Mileages and areas of native surfaced roads and parking lots will still appear in all summaries in the report and will remain in the road inventory database. In addition to this report, the FHWA will furnish the condition ratings of each route and segment to the Fish and Wildlife Service in a Microsoft Access database so the data can be included in their Real Property Inventory.

John Heinz

Summaries

Route Miles and Percentages by Functional Class and Condition Condition Rating (Based on RSL)*

F.C.	Excellent		Good		Fair		Poor		Failed		Total
	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles
I	0.00	0.0%	0.00	0.0%	0.38	100.0%	0.00	0.0%	0.00	0.0%	0.38
II	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.08	100.0%	0.00	0.0%	0.08
III	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
IV	0.00	0.0%	0.00	0.0%	0.11	100.0%	0.00	0.0%	0.00	0.0%	0.11
V	0.22	3.2%	5.56	82.4%	0.98	14.4%	0.00	0.0%	0.00	0.0%	6.75
Total	0.22	2.9%	5.56	75.9%	1.47	20.1%	0.08	1.1%	0.00	0.0%	7.33

*For a description of condition ratings for the various surface types see the Appendix.

Route Miles and Percentages by Surface Type and Condition Paved Condition Rating [Condition(RSL)]

Surface Type	Excellent		Good		Fair		Poor		Failed		Total
	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles
AS	0.22	27.8%	0.00	0.0%	0.50	63.2%	0.08	10.0%	0.00	0.0%	0.79
CO	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
Total	0.22	27.8%	0.00	0.0%	0.50	63.2%	0.08	10.0%	0.00	0.0%	0.79

Unpaved Condition Rating [Condition(RSL)]

Surface Type	Excellent		Good		Fair		Poor		Failed		Total
	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles
GR	0.00	0.0%	4.53	82.3%	0.98	17.7%	0.00	0.0%	0.00	0.0%	5.50
NA	0.00	0.0%	1.03	100.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	1.03
PR	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
Total	0.00	0.0%	5.56	85.1%	0.98	14.9%	0.00	0.0%	0.00	0.0%	6.54

Square Footage (Parking Areas) Condition Rating

Surface Type	Excellent		Good		Fair		Poor		Failed		Total
	Sq Ft	%	Sq Ft	%	Sq Ft	%	Sq Ft	%	Sq Ft	%	Sq Ft
AS	19,519	38.3%	13,307	26.1%	18,090	35.5%	0	0.0%	0	0.0%	50,916
CO	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
GR	0	0.0%	0	0.0%	6,294	100.0%	0	0.0%	0	0.0%	6,294
NA	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
PR	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
Total	19,519	34.0%	13,307	23.0%	24,384	43.0%	0	0.0%	0	0.0%	57,210

**John Heinz
Summaries**

Route Miles and Percentages by Use Type and Condition
Road Condition Rating: Public/Administrative Use

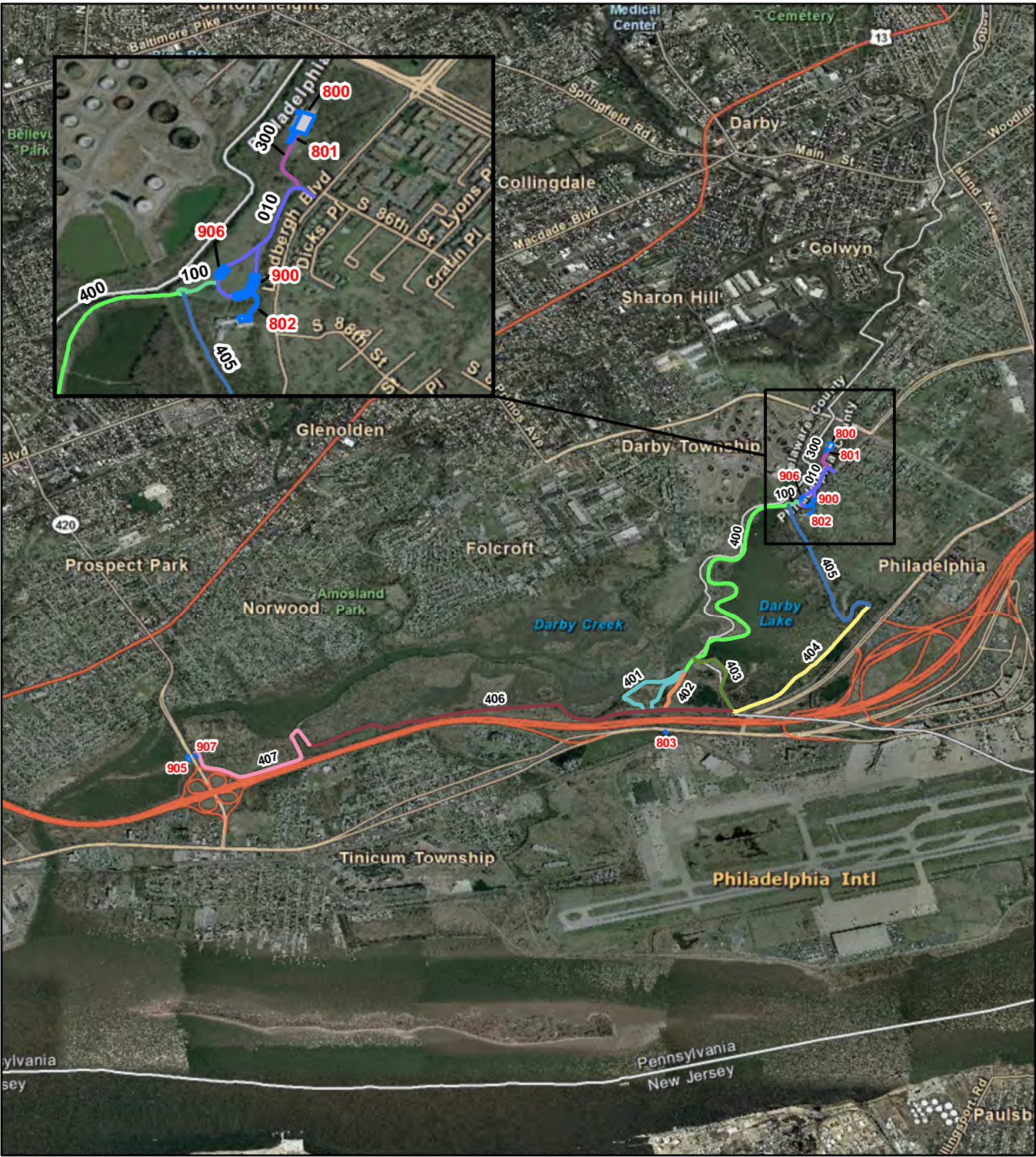
Use Type	Excellent		Good		Fair		Poor		Failed		Total
	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles
Admin	0.22	3.1%	5.56	81.0%	1.09	15.8%	0.00	0.0%	0.00	0.0%	6.86
Public	0.00	0.0%	0.00	0.0%	0.38	82.5%	0.08	17.5%	0.00	0.0%	0.47
Total	0.22	2.9%	5.56	75.9%	1.47	20.1%	0.08	1.1%	0.00	0.0%	7.33

Parking Condition Rating: Public/Administrative Use

Use Type	Excellent		Good		Fair		Poor		Failed		Total
	Sq Ft	%	Sq Ft	%	Sq Ft	%	Sq Ft	%	Sq Ft	%	Sq Ft
Admin	19,519	62.1%	0	0.0%	11,904	37.9%	0	0.0%	0	0.0%	31,423
Public	0	0.0%	13,307	51.6%	12,480	48.4%	0	0.0%	0	0.0%	25,787
Total	19,519	34.1%	13,307	23.3%	24,384	42.6%	0	0.0%	0	0.0%	57,210

John Heinz National Wildlife Refuge

ROUTE LOCATION MAP



John Heinz - 52570 - ROUTE IDENTIFICATION LIST (NUMERIC)

Shading Color Key:

White = Paved Routes
Yellow = Unpaved Routes

RTE #	Asset Number	ROUTE NAME	RTE MI	ROUTE DESCRIPTION	PAVED MI	UN-PAVED MI	LANES	FC
010	10022953	Visitor Access Road	0.38	From Northwest of Lindbergh Boulevard, 0.2 mi southeast of 84th Street, to end of loop	0.38	0.00	2	1
100		Boat Ramp Access Road	0.08	From Visitor Access Road (Route 010) to Boat Ramp	0.08	0.00	1	2
300	10022964	Maintenance Building Road	0.11	From Visitor Access Road (Route 010) to Maintenance Facility Parking (Route 800)	0.11	0.00	2	4
400	10022952	Dike Road	1.42	From Boat Ramp Access Road (Route 100) to Corps. Property Road (Route 402)	0.22	1.20	1	5
401		Restoration Site Road	0.66	From Dike Road (Route 400) to Penn DOT Road (Route 406)	0.00	0.66	1	5
402		Corps. Property Road	0.21	From Dike Road (Route 400) to Penn DOT Road (Route 406)	0.00	0.21	1	5
403		Cross Dike Road	0.37	From Trolley Bed Road (Route 404) to Dike Road (Route 400)	0.00	0.37	1	5
404	10022978	Trolley Bed Road	0.79	From Haul Road (Route 405) to Penn DOT Road (Route 406)	0.00	0.79	1	5
405	10022971	Haul Road	0.80	From Boat Ramp Access Road (Route 100) to Trolley Bed Road (Route 404)	0.00	0.80	1	5
406	10022986	Penn DOT Road	1.75	From Trolley Bed Road (Route 404) to Long Hook Creek Dike Road (Route 407)	0.00	1.75	1	5
407	10022970	Long Hook Creek Dike Road	0.75	From Penn DOT Road (Route 406) to gate next to 420 West Parking (Route 906)	0.00	0.75	1	5

John Heinz - 52570 - ROUTE IDENTIFICATION LIST (PARKING)

Shading Color Key:

White = Paved Parking Lots

Green = Unpaved Parking Lots

RTE #	Asset Number	ROUTE NAME	RTE SQFT	ROUTE DESCRIPTION	PAVED SQFT	UNPAVED SQFT
800	10022964	Maintenance Facility Parking	19,519		19,519	0
801	10022964	Maintenance Facility Overflow Parking	2,682		2,682	0
802		Employee Parking	6,256		6,256	0
803	10022972	SR 291 Parking	2,966		0	2,966
900	10022953	Visitor Parking	8,879		8,879	0
905		SR 420 Trail Parking	9,152		9,152	0
906	10022953	Trailhead Visitor Parking	4,428		4,428	0
907	10022959	420 West Parking	3,328		0	3,328

CHANGES TO THE FISH AND WILDLIFE SERVICE ROAD INVENTORY REPORT

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Routes added to previous inventory:

Rte #	Rte Name	Reason for Addition
100	Boat Ramp Access Road	New Public route
300	Maintenance Building Road	New Administrative Route
400	Dike Road	New Administrative Route
401	Restoration Site Road	New Administrative Route
402	Corps. Property Road	New Administrative Route
403	Cross Dike Road	New Administrative Route
404	Trolley Bed Road	New Administrative Route
405	Haul Road	New Administrative Route
406	Penn DOT Road	New Administrative Route
407	Long Hook Creek Dike Road	New Administrative Route
800	Maintenance Facility Parking	New Administrative Route
801	Maintenance Facility Overflow Parking	New Administrative Route
802	Employee Parking	New Administrative Route
907	420 West Parking	New Public route

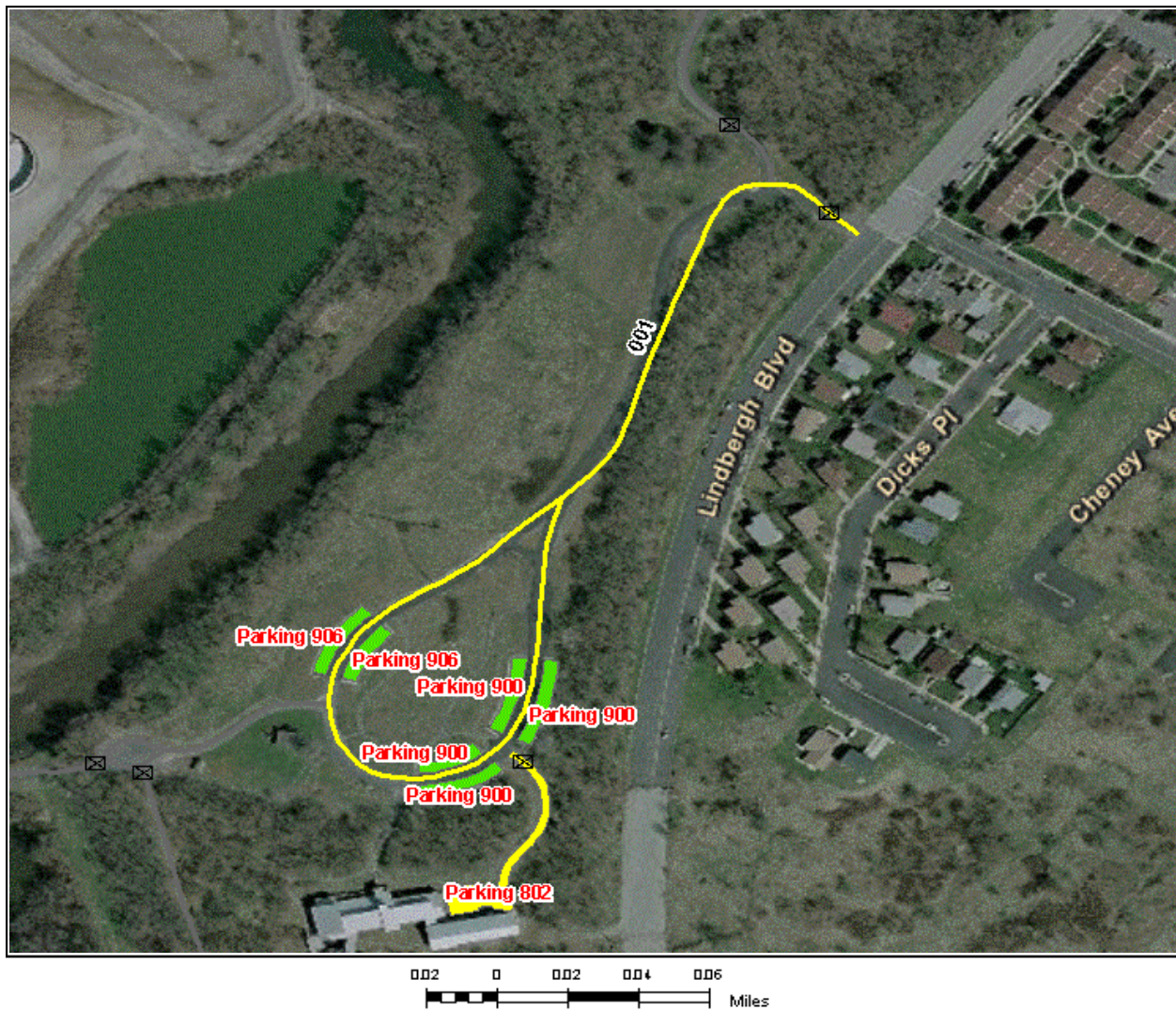
Routes removed from previous inventory:

Rte #	Rte Name	Reason for Removal

Routes modified from previous inventory:

Rte #	Rte Name	Type of Modification	Description of Modification
803	SR 291 Parking	Changed to administrative parking lot	

Comments:

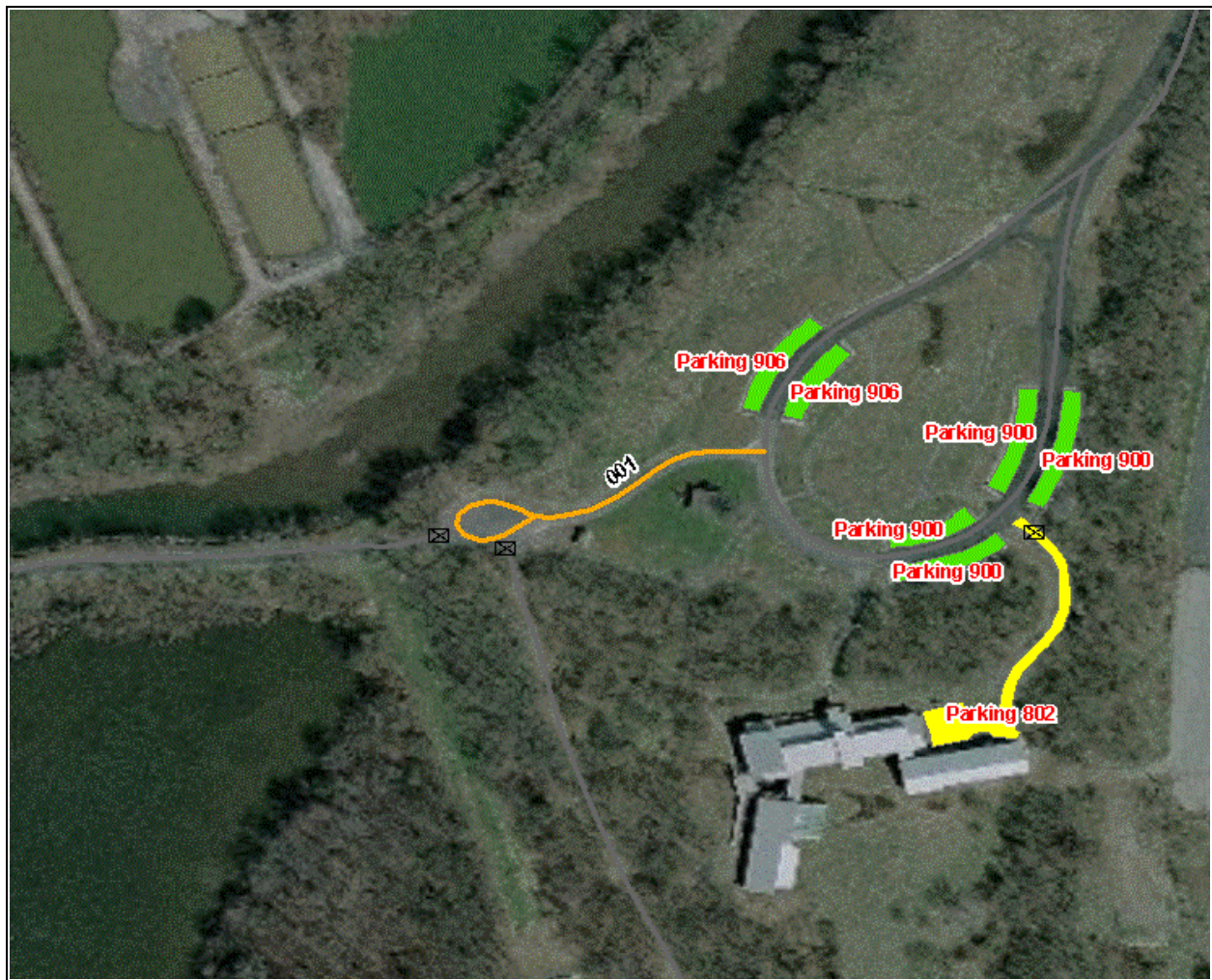


Route: 010 Visitor Access Road

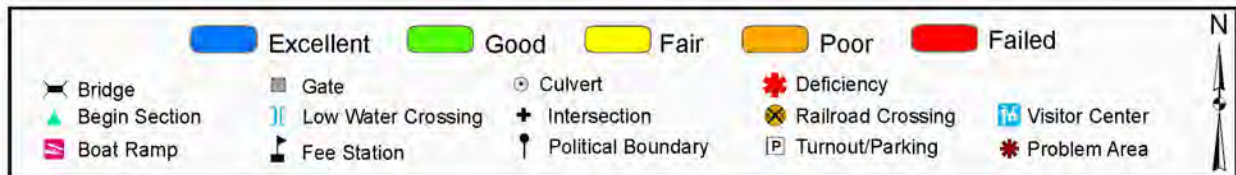
Total Route Length: **0.38 Miles**

Route Description: From Northwest of Lindbergh Boulevard, 0.2 mi southeast of 84th Street, to end of loop

Asset Number	10022953
Section Number	001
Section Length (miles)	0.38
Inspection Date	06/18/2010
Section Information	
Surface Type	Asphalt
Number of Lanes	2
Roadway Width (feet)	20.00
Roadway Condition Information	
Condition	Fair
Remaining Service Life (years)	12
Cost Estimate	50,300
CRV	557,100.00



0.01 0 0.01 0.02 0.03
Miles

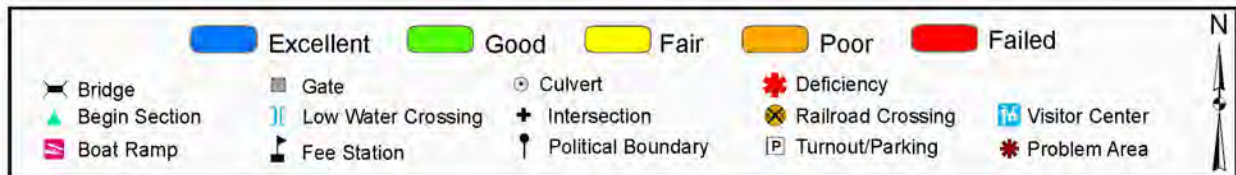
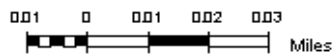
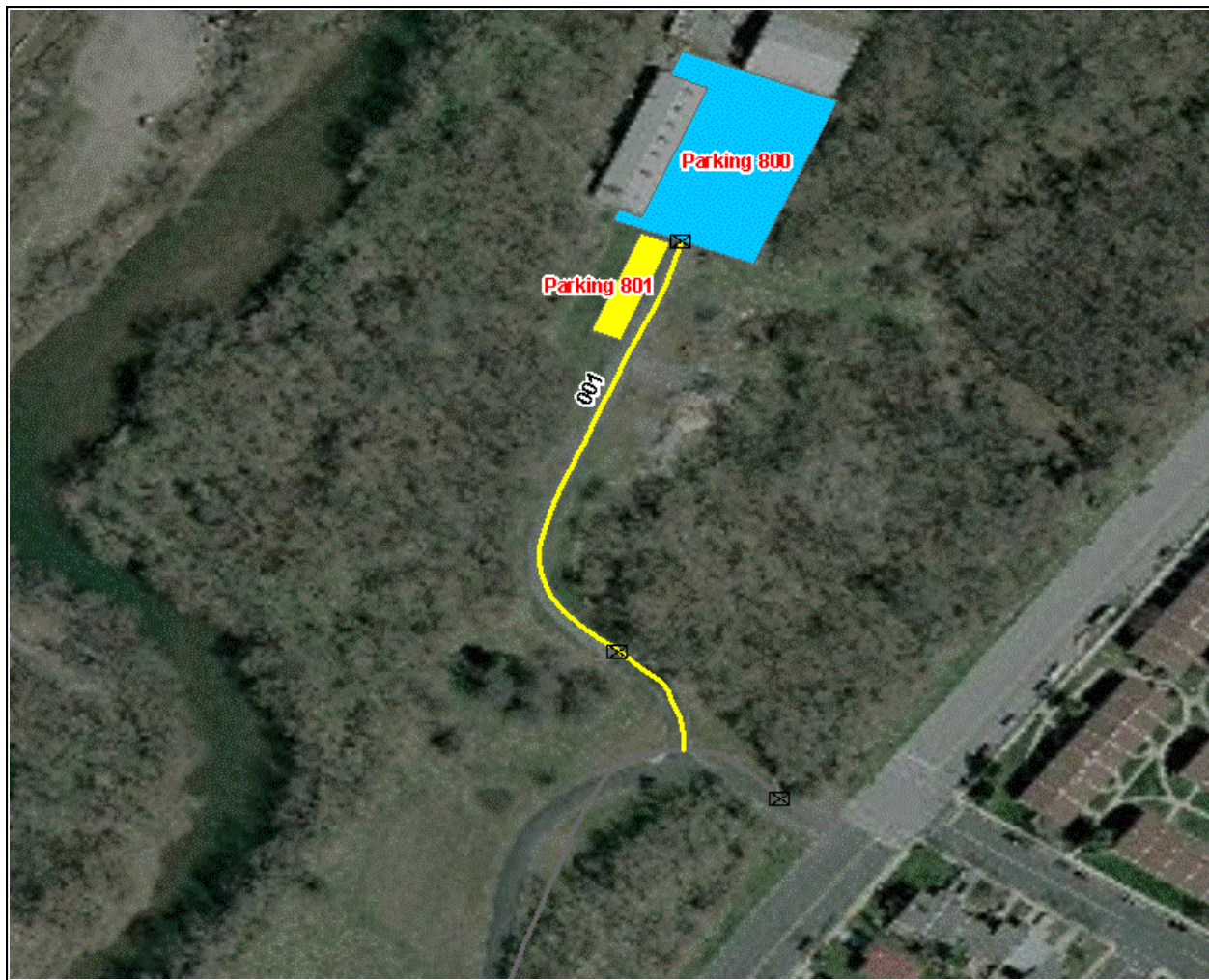


Route: 100 Boat Ramp Access Road

Total Route Length: **0.08 Miles**

Route Description: From Visitor Access Road (Route 010) to Boat Ramp

Asset Number	
Section Number	001
Section Length (miles)	0.08
Inspection Date	06/18/2010
Section Information	
Surface Type	Asphalt
Number of Lanes	1
Roadway Width (feet)	12.00
Roadway Condition Information	
Condition	Poor
Remaining Service Life (years)	6
Cost Estimate	58,200
CRV	118,200.00

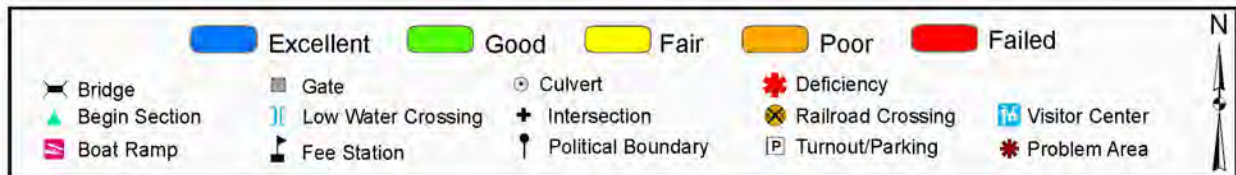
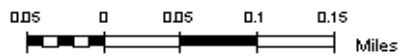
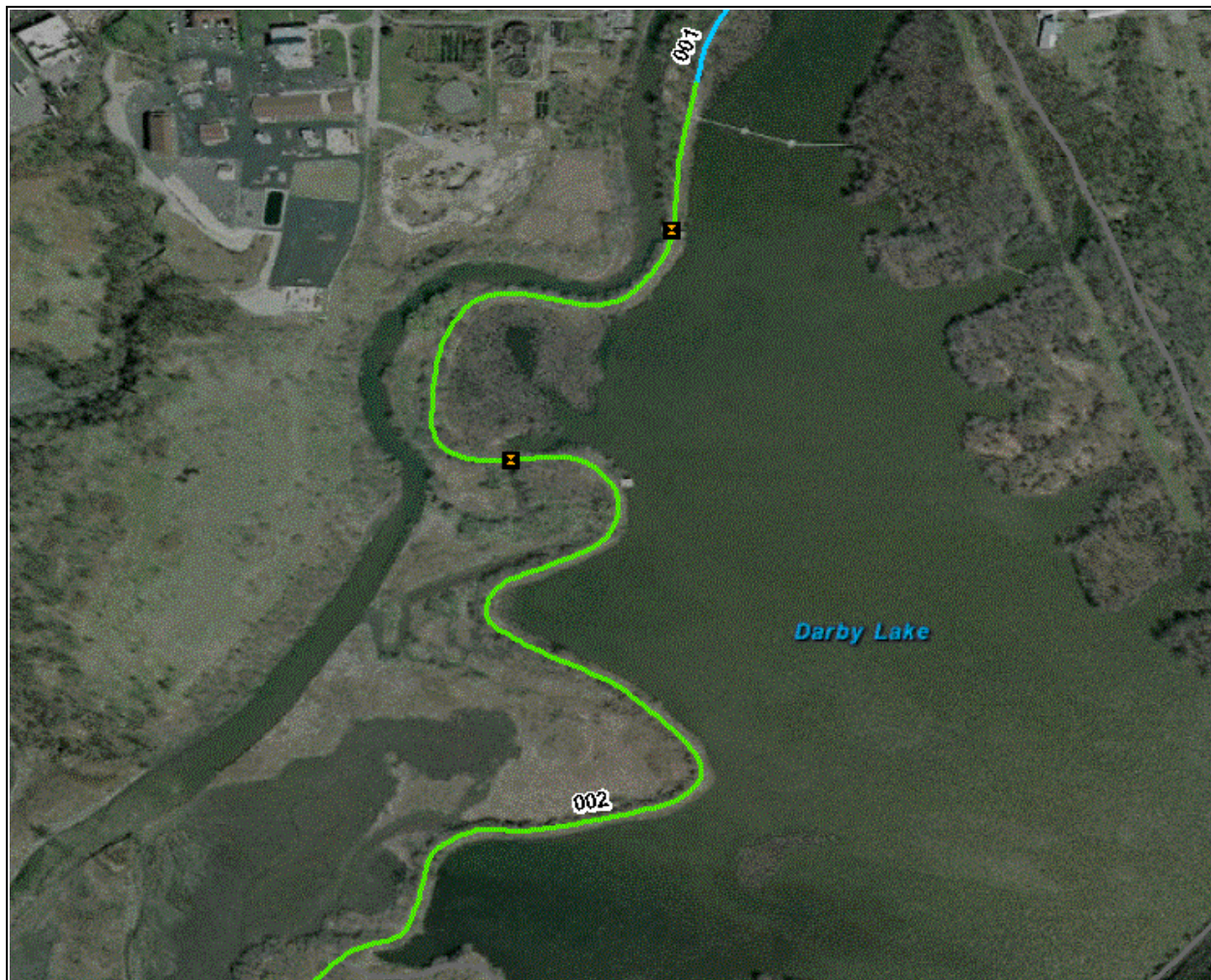


Route: 300 Maintenance Building Road

Total Route Length: **0.11 Miles**

Route Description: From Visitor Access Road (Route 010) to Maintenance Facility Parking (Route 800)

Asset Number	10022964
Section Number	001
Section Length (miles)	0.11
Inspection Date	06/18/2010
Section Information	
Surface Type	Asphalt
Number of Lanes	2
Roadway Width (feet)	16.00
Roadway Condition Information	
Condition	Fair
Remaining Service Life (years)	12
Cost Estimate	14,700
CRV	162,600.00

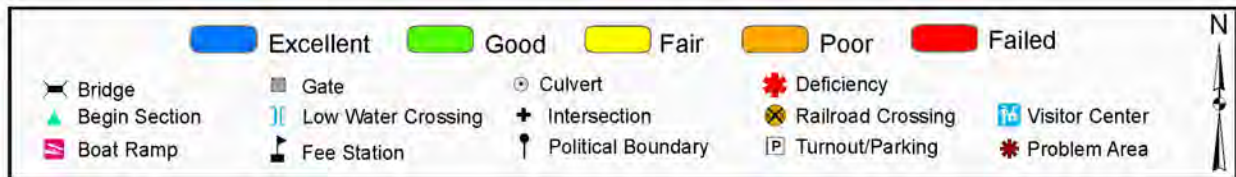


Route: 400 Dike Road

Total Route Length: **1.42 Miles**

Route Description: From Boat Ramp Access Road (Route 100) to Corps. Property Road (Route 402)

Asset Number	10022952	10022952
Section Number	001	002
Section Length (miles)	0.22	1.20
Inspection Date	06/18/2010	06/18/2010
Section Information		
Surface Type	Asphalt	Gravel
Number of Lanes	1	1
Roadway Width (feet)	12.00	12.00
Roadway Condition Information		
Condition	Excellent	Good
Remaining Service Life (years)	20	5
Cost Estimate	0	2,400
CRV	313,300.00	1,005,600.00



Route: 401 Restoration Site Road

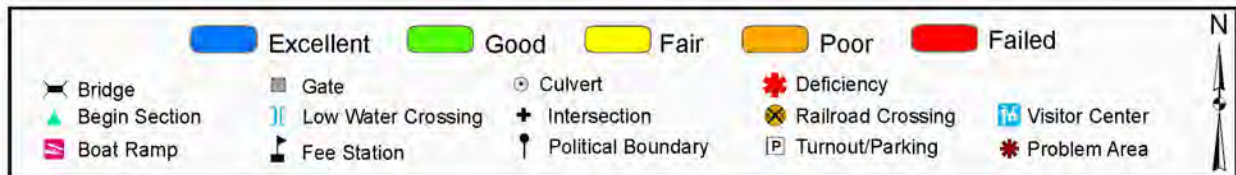
Total Route Length: **0.66 Miles**

Route Description: From Dike Road (Route 400) to Penn DOT Road (Route 406)

Asset Number		
Section Number	001	002
Section Length (miles)	0.41	0.25
Inspection Date	06/18/2010	06/18/2010
Section Information		
Surface Type	Native	Native
Number of Lanes	1	1
Roadway Width (feet)	10.00	10.00
Roadway Condition Information		
Condition	Good	Good
Remaining Service Life (years)	7	5
Cost Estimate	800	500
CRV	175,700.00	108,700.00



0.01 0 0.01 0.02 0.03 Miles

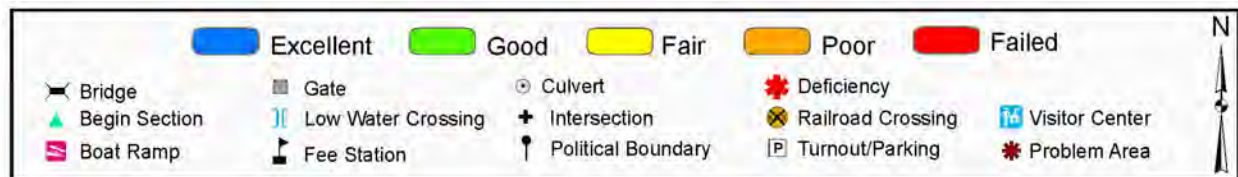
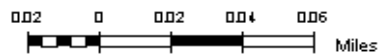


Route: 402 Corps. Property Road

Total Route Length: **0.21 Miles**

Route Description: From Dike Road (Route 400) to Penn DOT Road (Route 406)

Asset Number	
Section Number	001
Section Length (miles)	0.21
Inspection Date	06/18/2010
Section Information	
Surface Type	Gravel
Number of Lanes	1
Roadway Width (feet)	12.00
Roadway Condition Information	
Condition	Good
Remaining Service Life (years)	5
Cost Estimate	400
CRV	172,800.00

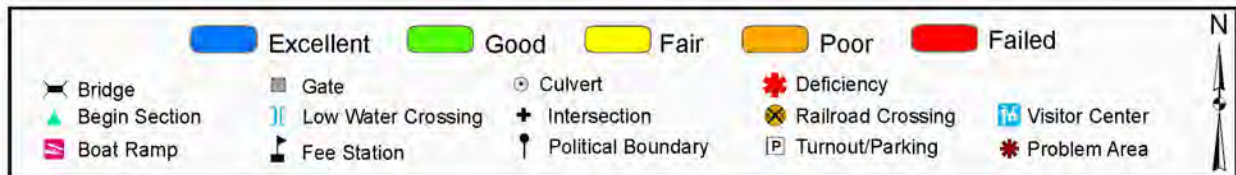
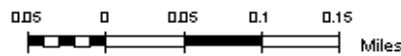


Route: 403 Cross Dike Road

Total Route Length: **0.37 Miles**

Route Description: From Trolley Bed Road (Route 404) to Dike Road (Route 400)

Asset Number	
Section Number	001
Section Length (miles)	0.37
Inspection Date	06/18/2010
Section Information	
Surface Type	Native
Number of Lanes	1
Roadway Width (feet)	10.00
Roadway Condition Information	
Condition	Good
Remaining Service Life (years)	5
Cost Estimate	800
CRV	162,000.00

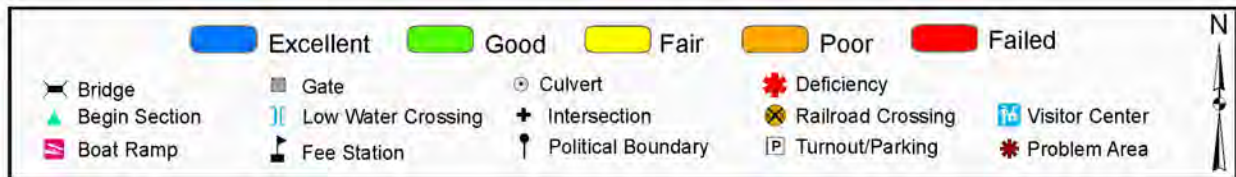
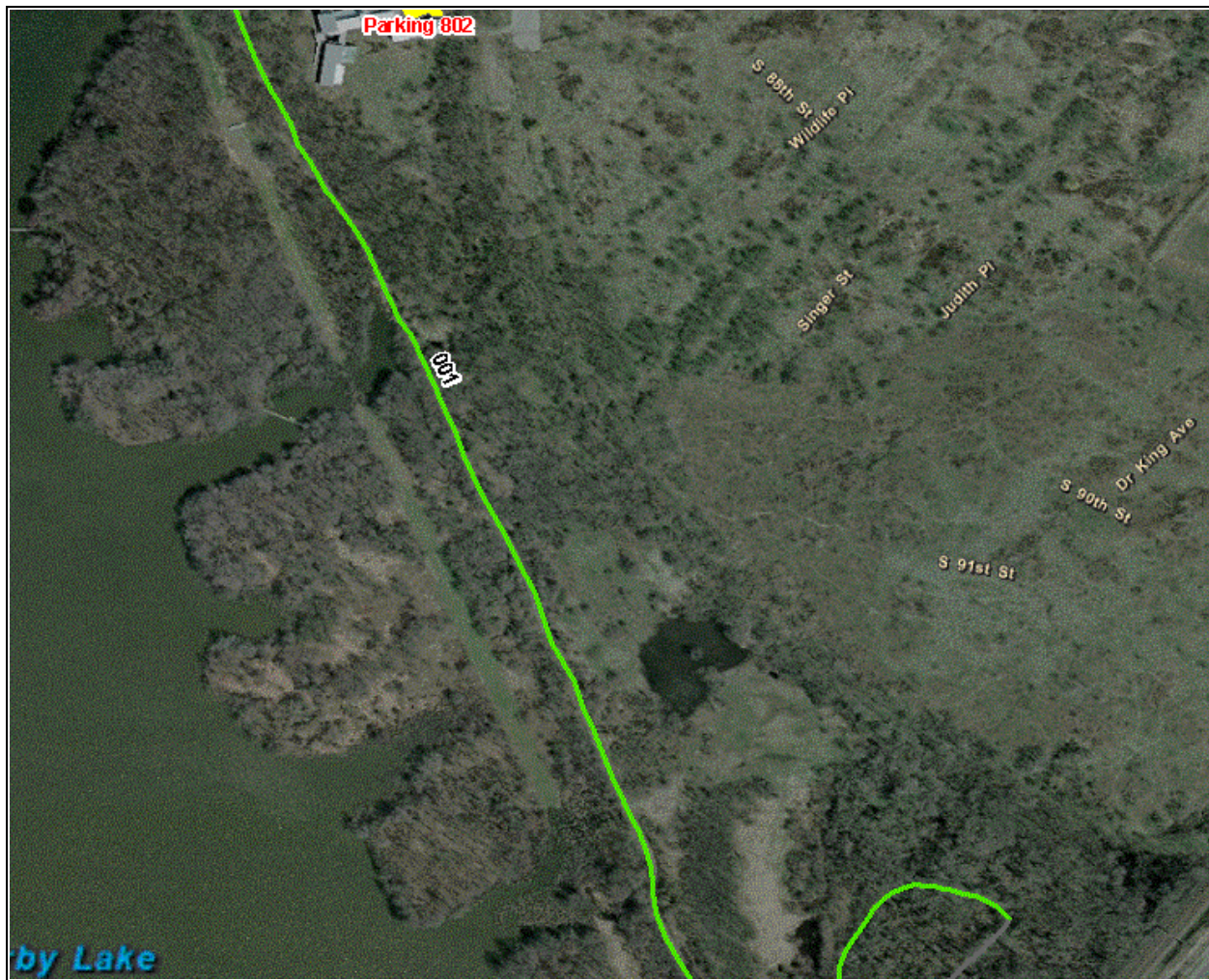


Route: 404 Trolley Bed Road

Total Route Length: **0.79 Miles**

Route Description: From Haul Road (Route 405) to Penn DOT Road (Route 406)

Asset Number	10022978
Section Number	001
Section Length (miles)	0.79
Inspection Date	06/18/2010
Section Information	
Surface Type	Gravel
Number of Lanes	1
Roadway Width (feet)	10.00
Roadway Condition Information	
Condition	Good
Remaining Service Life (years)	7
Cost Estimate	1,600
CRV	663,500.00

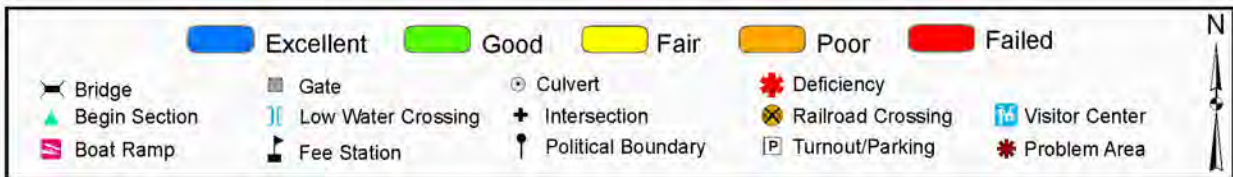
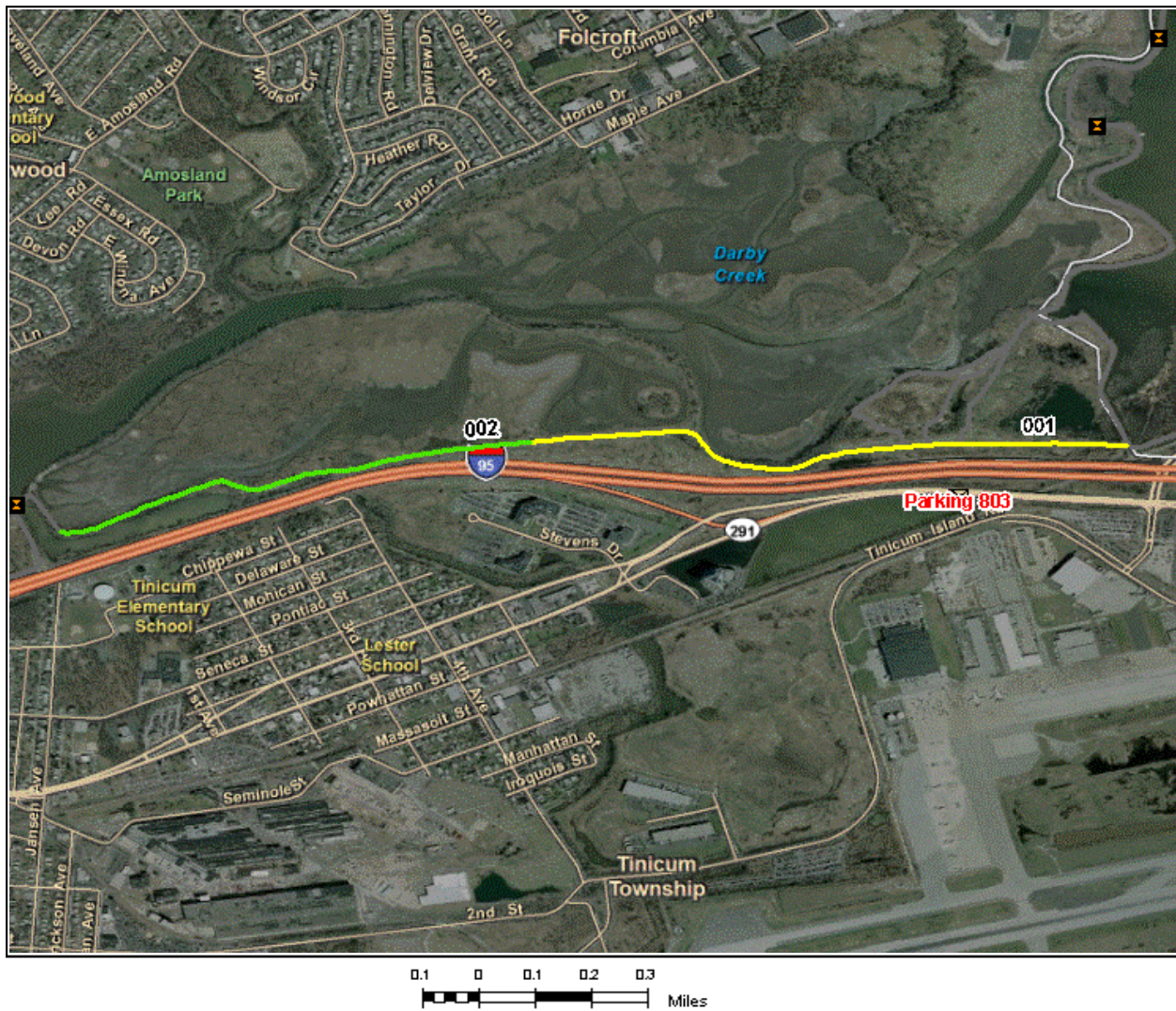


Route: 405 Haul Road

Total Route Length: **0.80 Miles**

Route Description: From Boat Ramp Access Road (Route 100) to Trolley Bed Road (Route 404)

Asset Number	10022971
Section Number	001
Section Length (miles)	0.80
Inspection Date	06/18/2010
Section Information	
Surface Type	Gravel
Number of Lanes	1
Roadway Width (feet)	12.00
Roadway Condition Information	
Condition	Good
Remaining Service Life (years)	5
Cost Estimate	1,600
CRV	667,400.00

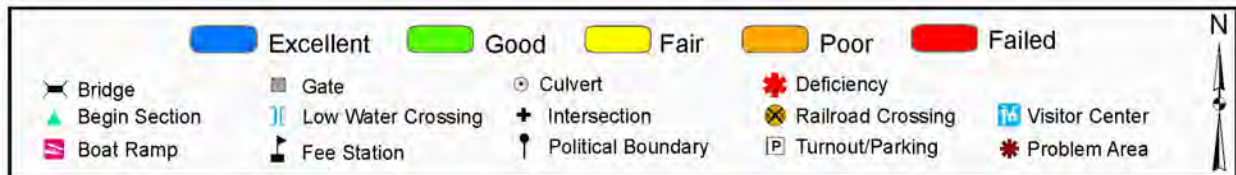


Route: 406 Penn DOT Road

Total Route Length: 1.75 Miles

Route Description: From Trolley Bed Road (Route 404) to Long Hook Creek Dike Road (Route 407)

Asset Number	10022986	10022986
Section Number	001	002
Section Length (miles)	0.98	0.78
Inspection Date	06/18/2010	06/18/2010
Section Information		
Surface Type	Gravel	Gravel
Number of Lanes	1	1
Roadway Width (feet)	10.00	10.00
Roadway Condition Information		
Condition	Fair	Good
Remaining Service Life (years)	4	5
Cost Estimate	4,200	1,500
CRV	815,400.00	650,400.00



Route: 407 Long Hook Creek Dike Road

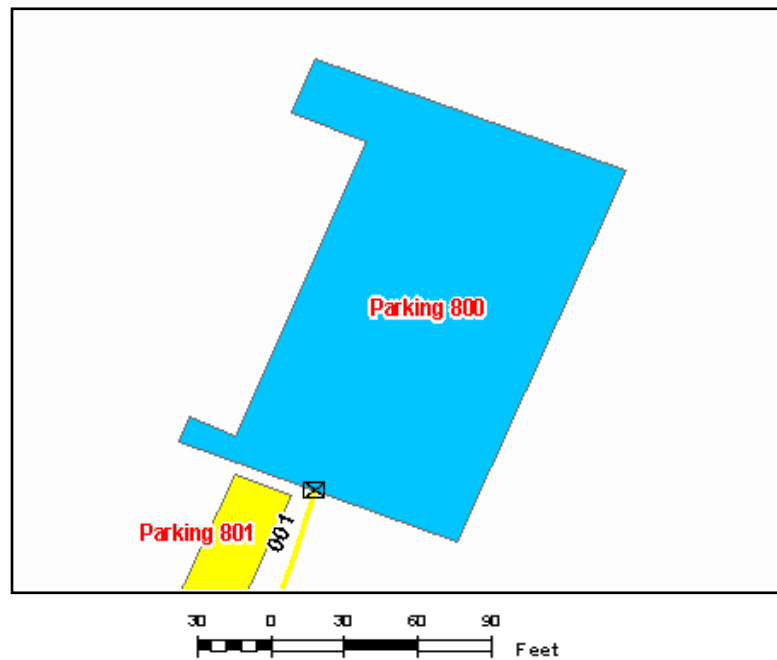
Total Route Length: **0.75 Miles**

Route Description: From Penn DOT Road (Route 406) to gate next to 420 West Parking (Route 906)

Asset Number	10022970
Section Number	001
Section Length (miles)	0.75
Inspection Date	06/18/2010
Section Information	
Surface Type	Gravel
Number of Lanes	1
Roadway Width (feet)	12.00
Roadway Condition Information	
Condition	Good
Remaining Service Life (years)	7
Cost Estimate	1,500
CRV	627,300.00

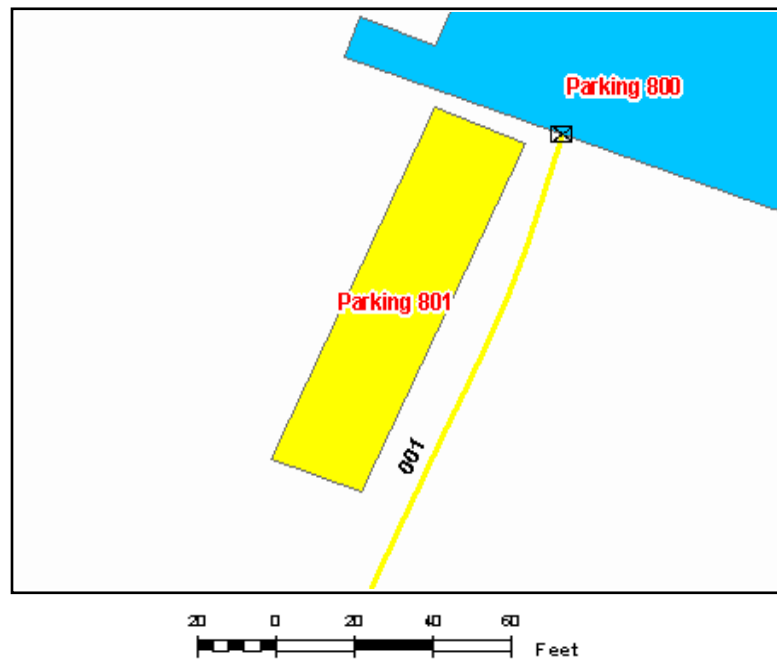
800: Maintenance Facility Parking

Asset Number	Date Visited	Surface Type	Area (Sq Ft)	Condition	Cost to Improve
10022964	06/18/2010	Asphalt	19,519	Excellent	0



801: Maintenance Facility Overflow Parking

Asset Number	Date Visited	Surface Type	Area (Sq Ft)	Condition	Cost to Improve
10022964	06/18/2010	Asphalt	2,682	Fair	2,800



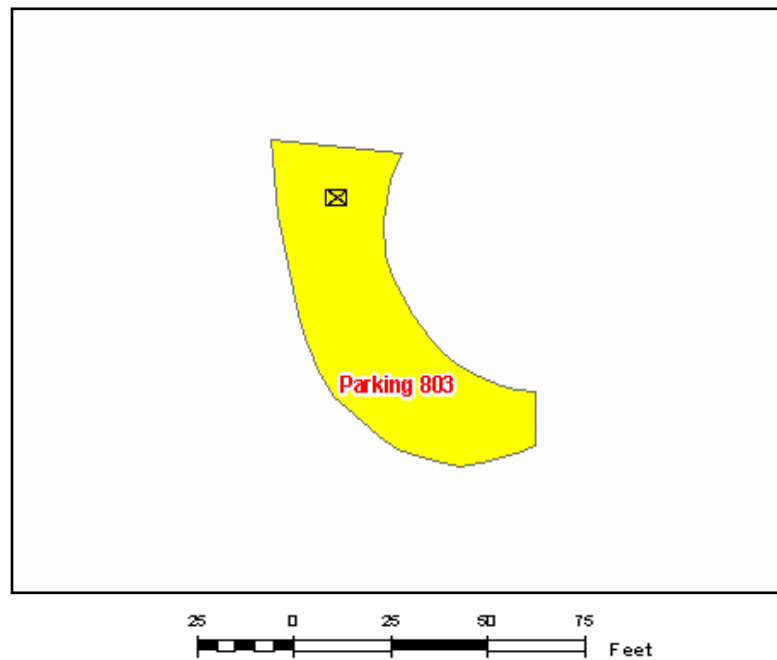
802: Employee Parking

Asset Number	Date Visited	Surface Type	Area (Sq Ft)	Condition	Cost to Improve
	06/18/2010	Asphalt	6,256	Fair	6,500



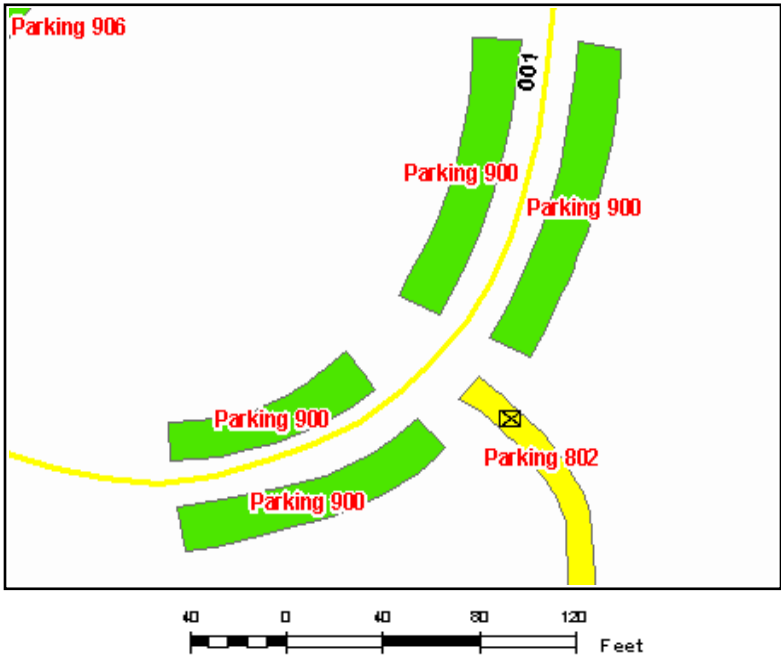
803: SR 291 Parking

Asset Number	Date Visited	Surface Type	Area (Sq Ft)	Condition	Cost to Improve
10022972	06/18/2010	Gravel	2,966	Fair	1,000



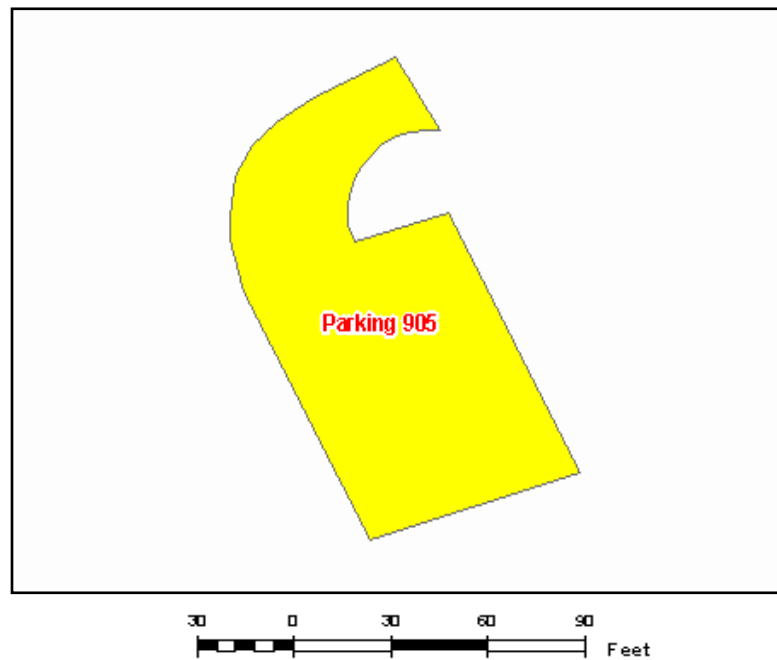
900: Visitor Parking

Asset Number	Date Visited	Surface Type	Area (Sq Ft)	Condition	Cost to Improve
10022953	06/18/2010	Asphalt	8,879	Good	2,000



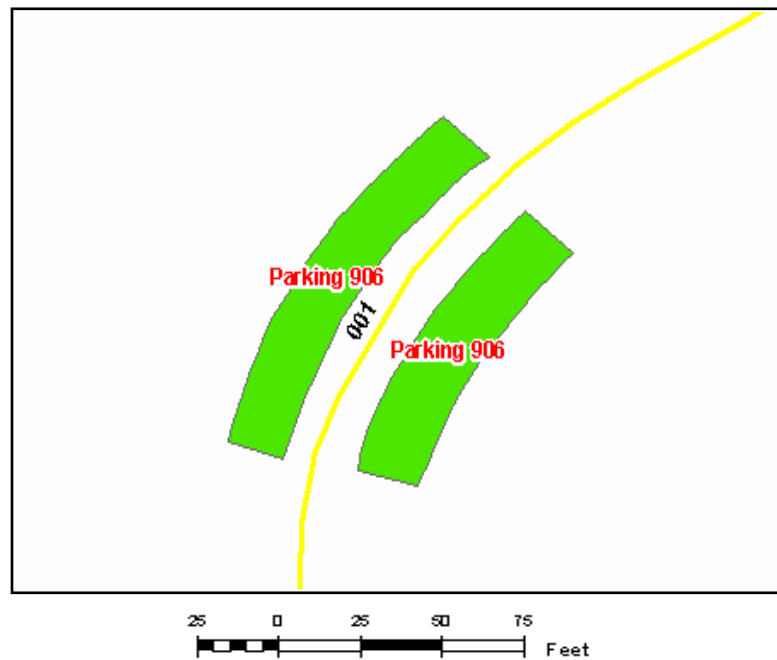
905: SR 420 Trail Parking

Asset Number	Date Visited	Surface Type	Area (Sq Ft)	Condition	Cost to Improve
	06/18/2010	Asphalt	9,152	Fair	9,500



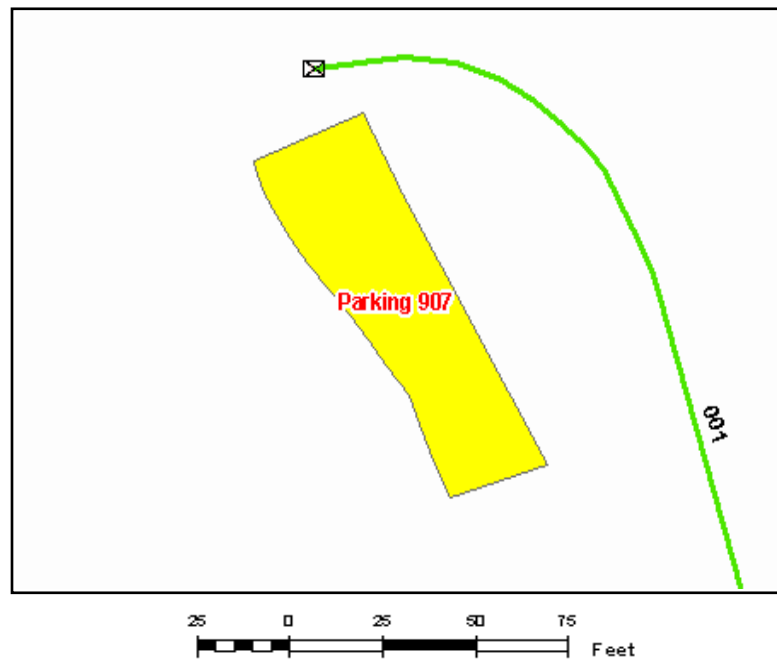
906: Trailhead Visitor Parking

Asset Number	Date Visited	Surface Type	Area (Sq Ft)	Condition	Cost to Improve
10022953	06/18/2010	Asphalt	4,428	Good	1,000



907: 420 West Parking

Asset Number	Date Visited	Surface Type	Area (Sq Ft)	Condition	Cost to Improve
10022959	06/18/2010	Gravel	3,328	Fair	1,100



John Heinz Bridge Inventory					
Route #	Milepost	NBIS #	Sufficiency Rating	Functionally Obsolete	Structurally Deficient
401	0.10	N/A			
401	0.29	N/A			

FEATURES PHOTOGRAPHS

ROUTE NUMBER: 010 ROUTE NAME: Visitor Access Road



Photo # JOHE_C4_0265 - MP 0.00 - Begin Section 001

ROUTE NUMBER: 010 ROUTE NAME: Visitor Access Road



Photo # JOHE_C4_0267 - MP 0.34 - Round Culvert Section 001

ROUTE NUMBER: 100 ROUTE NAME: Boat Ramp Access Road



Photo # JOHE_C4_0278 - MP 0.00 - Begin Section 001

FEATURES PHOTOGRAPHS

ROUTE NUMBER: 300 ROUTE NAME: Maintenance Building Road



Photo # JOHE_C4_0271 - MP 0.00 - Begin Section 001

ROUTE NUMBER: 400 ROUTE NAME: Dike Road



Photo # JOHE_C4_0280 - MP 0.00 - Begin Section 001

ROUTE NUMBER: 400 ROUTE NAME: Dike Road



Photo # JOHE_C4_0281 - MP 0.22 - Begin Section 002

FEATURES PHOTOGRAPHS

ROUTE NUMBER: 401 ROUTE NAME: Restoration Site Road



Photo # JOHE_C4_0286 - MP 0.00 - Begin Section 001

ROUTE NUMBER: 401 ROUTE NAME: Restoration Site Road



Photo # JOHE_C4_0289 - MP 0.41 - Begin Section 002

ROUTE NUMBER: 402 ROUTE NAME: Corps. Property Road



Photo # JOHE_C4_0290 - MP 0.00 - Begin Section 001

FEATURES PHOTOGRAPHS

ROUTE NUMBER: 403 ROUTE NAME: Cross Dike Road



Photo # JOHE_C4_0291 - MP 0.00 - Begin Section 001

ROUTE NUMBER: 404 ROUTE NAME: Trolley Bed Road



Photo # JOHE_C4_0299 - MP 0.00 - Begin Section 001

ROUTE NUMBER: 405 ROUTE NAME: Haul Road



Photo # JOHE_C4_0295 - MP 0.00 - Begin Section 001

FEATURES PHOTOGRAPHS

ROUTE NUMBER: 405 ROUTE NAME: Haul Road



Photo # JOHE_C4_0297 - MP 0.01 - Round Culvert Section 001

ROUTE NUMBER: 406 ROUTE NAME: Penn DOT Road



Photo # JOHE_C4_0304 - MP 0.00 - Begin Section 001

ROUTE NUMBER: 406 ROUTE NAME: Penn DOT Road



Photo # JOHE_C4_0305 - MP 0.98 - Begin Section 002

FEATURES PHOTOGRAPHS

ROUTE NUMBER: 407 ROUTE NAME: Long Hook Creek Dike Road



Photo # JOHE_C4_0306 - MP 0.00 - Begin Section 001

Accident Summary

Number of Accidents Reported	Timespan of Accidents	Injuries	Fatalities
0	No Accidents to Report	0	0

APPENDIX

TABLE 1 - GENERAL FWS ROAD FUNCTIONAL CLASSIFICATION	
Class I	Principal Refuge Road (Public Roads) - Routes that constitute the main access route, main auto tour route, or thoroughfare for refuge visitors. These routes are accessible by 2WD vehicles. Routes are numbered from 10 to 99.
Class II	Connector Refuge Road (Public Roads) - Routes that provide circulation within the refuge. These routes can also provide access to areas of scenic, scientific, recreational or cultural interest, such as overlooks, campgrounds, education centers, etc. These routes are accessible by 2WD vehicles. Routes are numbered from 100 to 199.
Class III	Special Purpose Refuge Road (Public Roads) - Roads that provide circulation within special use areas such as campgrounds or public concessionaire facilities or access to remote areas of the refuge. These routes may not be 2WD accessible. Routes are numbered from 200 to 299
Class IV	Administrative Access Road (Administrative Roads) - Routes intended for access to administrative developments or structures such as maintenance offices, employee quarters, or utility areas. These routes are accessible by 2WD vehicles. These routes may restrict access to the general public. Routes are numbered from 300 to 399.
Class V	Restricted Road (Administrative Roads) - Routes normally closed to the public, such as maintenance roads, service roads, patrol roads, and fire breaks. These routes may be open to the public for a short period of time for a special use, such as hunting access. These routes may not be 2WD accessible. Routes are numbered from 400 to 499.

A refuge road system contains those routes within or giving access to a refuge or other unit of the FWS that are administered by the FWS, or by the Service in cooperation with other agencies. The assignment of a functional classification (FC) to a refuge road is not based on traffic volumes or design speed, but on the intended use or function of that route

DESCRIPTION OF RATING SYSTEM

Rating Data is collected on four different surface types: Asphalt, Concrete, Gravel, and Native. The Utah LTAP Center's Remaining Service Life (RSL) system is used for all surface types. The RSL system is based on the Strategic Highway Research Program's (SHRP) Distress Identification Manual.

Asphalt Rating System

Data is collected on the following distresses and conditions:

- **Fatigue Cracking** - Interconnected cracks forming small irregular shapes.
- **Longitudinal Cracking** - Cracks running parallel with the roadway, in the direction of traffic.
- **Transverse Cracking** - Cracks perpendicular to the roadway, going across the lane or lanes.
- **Block Cracking** - Interconnected cracks forming large blocks.
- **Edge Cracking** - Cracks running along the edge of the pavement surface.
- **Patches** - Original surface repaired with new asphalt patch material.
- **Potholes** - Holes or depressions in the pavement.
- **Rutting** - surface depressions in the wheel paths.
- **Roughness** - Evenness of pavement for serviceability.
- **Drainage** - Ability of the road surface to drain water based on proper slope.

A Condition Rating value is calculated for each homogenous pavement section, and can be up to 1 mile in length.

Rating Index Formula

Fatigue, longitudinal, transverse, block, and edge cracking, along with patching and potholes are rated on a 0 - 9 scale (0 = no distress, 9 = maximum distress). The rating given is based on the extent and the severity of the distress. Rutting, roughness, and drainage are rated on a 0 - 3 scale (0 = excellent, 3 = poor). Each distress type has given Remaining Service Life (RSL) values (in years) based on the rating for that particular distress. The distress with the rating resulting in the lowest RSL value is considered to be the governing distress. That value is then assigned as the RSL of the road segment.

Concrete Rating System

Data is collected on the following distresses and conditions:

- **Spalling of Joints** - Chipping, breaking, or cracking of slab edges
- **Joint Seal Damage** - Any damage or condition that enables materials or water to infiltrate into the joint from the surface.
- **Corner Breaks** - A portion of the slab separated by a crack that intersects the adjacent transverse and longitudinal joints, forming approximately a 45° angle to the direction.
- **Broken Slabs** - Faulting and/or cracking localized to individual slabs.

- **Faulting** – Difference in elevation across a crack or joint.
- **Longitudinal Cracking** – Cracks in the pavement running parallel to road.
- **Transverse Cracking** - Cracks in the pavement running perpendicular to the direction of traffic.
- **Patch Deterioration** – Faulting, settling, or cracking of previously placed patch
- **Map Cracking** – A series of cracks that extend only into the upper surface of the Slab

A Condition Rating value is calculated for each homogenous pavement section, and can be up to 1 mile in length.

Rating Index Formula

The rating procedure for concrete pavement is the same as that for asphalt pavement described previously. Each of the distresses described above are rated on the same 0 – 9 scale. The governing distress is then determined and the RSL associated with that distress is assigned to the road segment.

Gravel and Native Rating System

Data is collected on the following distresses and conditions:

- **Cross Section (Crown)** - Roadway built so that the center is higher than the shoulder, to prevent water from pooling on roadway.
- **Roadside Drainage** - Roadside ditches and culverts to handle water flow and prevent pooling on the roadside.
- **Corrugations (Washboarding)** - Small trenches or holes developing perpendicular to the roadway.
- **Potholes** - Holes or depressions in the roadway.
- **Rutting** - Depressions running parallel with the roadway, in the wheelpaths.
- **Dust** - Amount of dust caused by traffic.
- **Loose Aggregate (Gravel Only)** - Loose gravel, typically piled up on the roadway edges or centerline.

A Condition Rating value is calculated for each homogenous pavement section, and can be up to 1 mile in length.

Rating Index Formula

The rating procedure for unpaved roads is the same as that for asphalt and concrete pavements described previously. Of the distresses described above, corrugations, potholes, rutting, and loose aggregate are rated on the same 0 – 9 scale previously mentioned. Cross section, roadside drainage, and dust are rated on the same 0 – 3 scale described for asphalt pavement. The governing distress is then determined and the RSL associated with that distress is assigned to the road segment.

Condition Descriptions by Surface Type

The following definitions are used to describe pavement condition for the various surface types. These are general guidelines for condition indications.

Asphalt

Excellent – Recently constructed or overlaid road where construction or overlay was performed correctly- No maintenance required. RSL = 19-20 years.

Good – Low extent longitudinal and transverse cracks. All cracks are 1/4" or less with little or no crack erosion. Patches are in good condition and applied correctly. Routine Maintenance recommended. RSL = 13-18 years.

Fair - Roads are in good structural condition with little or no fatigue cracking. Longitudinal, transverse, and edge cracking is at medium extent and severity. Block cracking is not extensive. Any patches are in good condition. Preventative maintenance recommended. RSL = 7-12 years.

Poor - Road beginning to show signs of structural distress. Fatigue cracking is medium to high extent and medium severity. Cracking will be severe. Surface may have severe block cracking and show. Patches are in fair to poor condition. There is moderate distortion or rutting and occasional potholes. Rehabilitation recommended. RSL = 1-6 years.

Failed - Road is severely deteriorated. Signs of structural failure appear along with severe and extensive fatigue cracking, distortion, potholes, or extensive patches in poor condition. Reconstruction recommended. RSL = 0 years.

Concrete

Excellent - New pavement. No maintenance required. RSL = 19-20 years

Good - First signs of transverse cracking, patch or repair, more extensive pop-outs, or scaling. Sealing or routine maintenance recommended. RSL = 13-18 years.

Fair – Pavement has joint or crack spalling, and/or faulting, along with cracking at corners with broken pieces. Any Patches are in fair condition and faulting is at a minimum. Preventative maintenance recommended. RSL = 7-12 years.

Poor - Joints and cracks are open 1 inch, spalled, or patched. Faulting is more severe. Rehabilitation recommended. RSL = 1-6 years.

Failed - Most slabs have failed structurally, and faulting is severe. Reconstruction recommended. RSL = 0 years.11-9

The following table shows the relationship between RSL and condition.

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE (Asphalt and Concrete Pavements)								
	FAILED	POOR		FAIR		GOOD		EXCELLENT
RSL Years	0	1-3	4-6	7-9	10-12	13-15	16-18	19-20

Gravel and Native

Note - Native surfaces do not have a gravel layer.

Excellent - Newly constructed road that has been constructed properly with proper crown, drainage and gravel layer. Little or no distress. No maintenance recommended. RSL = 8-10 years.

Good - Crown, drainage provisions, and gravel layer are in good condition. Distress limited to traffic effects such as dust, loose aggregate, and low severity corrugations (wash boarding). RSL = 5-7 years.

Fair - Adequate drainage and crown through majority of roadway. Crown repair, ditch improvement may be necessary. Road has more severe corrugations and potholes. Preventative maintenance recommended. RSL = 3-4 years.

Poor - Travel at slow speeds is necessary. Additional gravel layer needed to carry traffic. Poor crown. Ditching is inadequate and rutting is extensive and severe. Rehabilitation recommended. RSL = 1-2 years.

Failed - Travel is difficult, and road may be closed at times. Rutting and Corrugations are very severe. Total Reconstruction of road is recommended. RSL = 0 years.

The following table shows the RSL values for gravel and native roads in terms of excellent, good, fair, poor, and failed condition.

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE (Gravel and Native Surfaces)					
	FAILED	POOR	FAIR	GOOD	EXCELLENT
RSL Years	0	1-2	3-4	5-7	8-10

NATIVE PRIMITIVE/IMPROVED RATING SHEET

<u>Cross Section (Crown)*</u>			
Severity	Condition		Description
	No Defects	0	Crown 4-6" with no restriction of water flow from centerline to ditch.
	Minor Defects	1	Inadequate or inconsistent crown. Drainage to ditch may be restricted.
	Moderate Defects	2	Flat crown, drainage to ditch restricted.
	Major Defects	3	Reverse crown, bowl-shaped road, drainage on roadway

<u>Rutting</u>				
Severity	Extent (Length)			
	No Defects	Low <10%	Med 10-30%	High >30%
	Low < 6"	1	2	3
	Med 6-12"	4	5	6
	High > 12"	7	8	9

<u>Roadside Drainage*</u>			
Severity	Condition		Description
	No Defects	0	Wide, deep ditches (>4') with no restriction to water flow.
	Minor Defects	1	Adequate ditches (>2' deep), minor obstructions restrict water flow.
	Moderate Defects	2	Shallow, narrow and obstructed ditches. Minor erosion of road.
	Major Defects	3	No ditch, drainage on roadway with moderate to severe erosion.

<u>Potholes</u>				
Severity	Extent (Area)			
	No Defects	Low <10%	Med 10-30%	High >30%
	Low < 6"	1	2	3
	Med 6-12"	4	5	6
	High > 12"	7	8	9

<u>Dust</u>			
Severity	Condition		Description
	No Defects	0	No obstruction to sight distance.
	Minor Defects	1	Sight distance > 550'
	Moderate Defects	2	Sight distance 225'-550'
	Major Defects	3	Sight distance < 225'

<u>Corrugations</u>				
Severity	Extent (Length)			
	No Defects	Low <10%	Med 10-30%	High >30%
	Low < 3"	1	2	3
	Med 3-6"	4	5	6
	High > 6"	7	8	9

* Crown and Drainage are not rated for roads that have no constructed crown or drainage. This applies to Native and Gravel roads.

GRAVEL RATING SHEET

Cross Section (Crown)

Severity	Condition		Description
	No Defects	0	Crown 4-6" with no restriction of water flow from centerline to ditch.
	Minor Defects	1	Inadequate or inconsistent crown. Drainage to ditch may be restricted.
	Moderate Defects	2	Flat crown, drainage to ditch restricted.
	Major Defects	3	Reverse crown, bowl-shaped road, drainage on roadway

Rutting

Severity	No Defects	Extent (Length)		
		Low <10%	Med 10-30%	High >30%
	Low < 1"	1	2	3
	Med 1-3"	4	5	6
	High > 3"	7	8	9

Roadside Drainage

Severity	Condition		Description
	No Defects	0	Wide, deep ditches (>4') with no restriction to water flow.
	Minor Defects	1	Adequate ditches (>2' deep), minor obstructions restrict water flow.
	Moderate Defects	2	Shallow, narrow and obstructed ditches. Minor erosion of road.
	Major Defects	3	No ditch, drainage on roadway with moderate to severe erosion.

Potholes

Severity	No Defects	Extent (Area)		
		Low <10%	Med 10-30%	High >30%
	Low < 1"	1	2	3
	Med 1-3"	4	5	6
	High > 3"	7	8	9

Dust

Severity	Condition		Description
	No Defects	0	No obstruction to sight distance.
	Minor Defects	1	Sight distance > 550'
	Moderate Defects	2	Sight distance 225'-550'
	Major Defects	3	Sight distance < 225'

Corrugations

Severity	No Defects	Extent (Length)		
		Low <10%	Med 10-30%	High >30%
	Low < 2"	1	2	3
	Med 2-4"	4	5	6
	High > 4"	7	8	9

* Crown and Drainage are not rated for roads that have no constructed crown or drainage. This applies to Native and Gravel roads.

Loose Aggregate

Severity	No Defects	Extent (Area)		
		Low <10%	Med 10-30%	High >30%
	Low < 1"	1	2	3
	Med 1-3"	4	5	6
	High > 3"	7	8	9

ASPHALT RATING SHEET

Fatigue Cracking

Severity	Extent			
	No Defects	Low 1 crack WP	Med 2 cracks WP	High >30% length
	Low-Cracks < 1/4"	1	2	3
	Med-Cracks 1/4-3/4"	4	5	6
	High-Cracks > 3/4"	7	8	9

Edge Cracking

Severity	Extent (Length)			
	No Defects	Low <10%	Med 10-30%	High >30%
	0-6" from curb	1	2	3
	6-18" from curb	4	5	6
	> 18" from curb	7	8	9

Longitudinal Cracking

Severity	Extent			
	No Defects	Low 1 crack full length	Med 2 cracks full length	High >2 cracks full length
	Low-Cracks < 1/4"	1	2	3
	Med-Cracks 1/4-3/4"	4	5	6
	High-Cracks > 3/4"	7	8	9

Block Cracking

Severity	Extent (Length)			
	No Defects	Low > 15x15' squares	Med 15-10' squares	High <10x10' squares
	Low-Cracks < 1/4"	1	2	3
	Med-Cracks 1/4-3/4"	4	5	6
	High-Cracks > 3/4"	7	8	9

Transverse Cracking

Severity	Extent (ft between cracks)			
	No Defects	Low > 200'	Med 200-50'	High < 50'
	Low-Cracks < 1/4"	1	2	3
	Med-Cracks 1/4-3/4"	4	5	6
	High-Cracks > 3/4"	7	8	9

Utility Cuts

Severity	Extent (Length)			
	No Defects	Low <10%	Med 10-30%	High >30%
	Low-Cracks < 1/4"	1	2	3
	Med-Cracks 1/4-3/4"	4	5	6
	High-Cracks > 3/4"	7	8	9

Drainage/Roughness/Rutting

Severity	Condition		Description
	No Defects	0	Wide, deep ditches with no obstructions, smooth ride, no rutting, no potholes.
	Minor Defects	1	Drainage may be obstructed, < 1" rutting, minor roughness.
	Moderate Defects	2	Poor drainage, 1-2" rutting, noticeable roughness, potholes < 6" wide.
	Major Defects	3	No drainage; > 2" rutting; potholes 6-12" wide create roughness requiring reduced speeds.

CONCRETE RATING SHEET

Spalling of Joints

Extent (% joints)				
No Defects	Low <10%	Med 10-20%	High >20%	
Severity	Low Spalls < 3"	1	2	3
	Med Spalls 3-6"	4	5	6
	High Spalls > 6"	7	8	9

Broken Slabs

Extent (% slabs)				
No Defects	Low <5%	Med 5-15%	High >15%	
Severity	Low-no more than 3 pieces, no spalling/faulting	1	2	3
	Med-broken into >3 pieces, spalling/faulting <1/4"	4	5	6
	High-4 or more pieces, spalling/faulting >1/4"	7	8	9

Transverse Cracks

Extent (% slabs)				
No Defects	Low <10%	Med 10-20%	High >20%	
Severity	Low-Cracks < 1/8"; no spalling/faulting	1	2	3
	Med-Cracks 1/8-1/2"; spall <3", fault >1/4"	4	5	6
	High-Cracks > 1/2"; spall >3", fault >1/4"	7	8	9

Joint Seal Damage

Extent (%joints)				
No Defects	Low <10%	Med 10-20%	High >20%	
Severity	Low <10% joint length	1	2	3
	Med 10-50% joint length	4	5	6
	High >50% joint length	7	8	9

Faulting

Extent (Length)				
No Defects	Low <10%	Med 10-30%	High >30%	
Severity	Low < 1/2"	1	2	3
	Med 1/2-1"	4	5	6
	High > 1"	7	8	9

Patch Deterioration

Extent (Area)				
No Defects	Low <10%	Med 10-30%	High >30%	
Severity	Low-no fault, no settle at perimeter	1	2	3
	Med-fault & settle <1/4" at perimeter	4	5	6
	High-fault & settle >1/4" at perimeter, cracked patch	7	8	9

Corner Breaks

Extent (% of slabs)				
No Defects	Low <10%	Med 10-20%	High >20%	
Severity	Low-corner cracks, no spalling or faulting	1	2	3
	Med-crack slightly spalled & faulted <1/4"	4	5	6
	High-crack highly spalled & faulted >1/4"	7	8	9

Longitudinal Cracks

Extent (% slabs)				
No Defects	Low <10%	Med 10-20%	High >20%	
Severity	Low-Cracks < 1/8"; no spalling/faulting	1	2	3
	Med-Cracks 1/8-1/2"; spall <3", fault >1/2"	4	5	6
	High-Cracks > 1/2"; spall >3", fault >1/2"	7	8	9

Map Cracks

Extent (Area)				
No Defects	Low <10%	Med 10-20%	High >20%	
Severity	Low-small connected cracks, no spalling	1	2	3
	Med-connected cracks, no spalling	4	5	6
	High-large connected cracks with surface spalling	7	8	9

Deficiency Ratings With Associated Remaining Service Life

Asphalt Rating Sheet

Fatigue Cracking		Edge Cracking		Transverse Cracking		Utility Cuts	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	20	0	20	0	20	0	20
1	10	1	12	1	14	1	14
2	8	2	10	2	12	2	12
3	6	3	8	3	10	3	10
4	8	4	10	4	12	4	12
5	6	5	8	5	10	5	10
6	4	6	6	6	8	6	8
7	6	7	8	7	10	7	10
8	2	8	6	8	6	8	6
9	0	9	4	9	2	9	2

Longitudinal Cracking		Block Cracking		Drainage/Roughness/Rutting	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	20	0	20	0	20
1	14	1	12	1	16
2	12	2	10	2	10
3	10	3	8	3	4
4	12	4	10		
5	10	5	8		
6	8	6	6		
7	10	7	12		
8	8	8	6		
9	6	9	2		

Concrete Rating Sheet

Spalling		Broken Slabs		Transverse Cracks	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	20	0	20	0	20
1	15	1	15	1	18
2	12	2	12	2	15
3	10	3	10	3	12
4	12	4	12	4	15
5	10	5	10	5	10
6	8	6	8	6	6
7	10	7	10	7	10
8	6	8	6	8	4
9	0	9	0	9	0

Joint Seal Damage		Faulting		Patch Deterioration	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	20	0	20	0	18
1	16	1	15	1	16
2	14	2	12	2	14
3	12	3	10	3	12
4	14	4	12	4	12
5	10	5	8	5	10
6	8	6	6	6	8
7	12	7	10	7	10
8	8	8	4	8	6
9	6	9	0	9	0

Corner Breaks		Longitudinal Cracks		Map Cracks	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	18	0	20	0	20
1	16	1	18	1	18
2	14	2	15	2	15
3	12	3	12	3	12
4	12	4	15	4	12
5	10	5	10	5	10
6	8	6	6	6	6
7	10	7	10	7	10
8	6	8	4	8	4
9	0	9	0	9	0

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE IN YEARS (Asphalt & Concrete Roads)

RSL	FAILED 0	POOR 1 - 6	FAIR 7 - 12	GOOD 13 - 18	EXCELLENT 19 - 20
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Deficiency Ratings With Associated Remaining Service Life

Native Primitive Improved Rating Sheet

Cross Section		Rutting		Roadside Drainage	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	10	0	10	0	10
1	7	1	9	1	8
2	5	2	7	2	4
3	0	3	5	3	0
		4	7		
		5	4		
		6	3		
		7	4		
		8	2		
		9	0		

Potholes		Dust		Corrugations	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	10	0	10	0	10
1	9	1	8	1	9
2	7	2	6	2	7
3	5	3	2	3	7
4	7			4	6
5	4			5	5
6	3			6	5
7	4			7	4
8	2			8	3
9	0			9	0

Gravel Rating Sheet

Cross Section		Rutting		Roadside Drainage	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	10	0	10	0	10
1	7	1	9	1	8
2	5	2	7	2	4
3	0	3	5	3	0
		4	7		
		5	4		
		6	3		
		7	4		
		8	2		
		9	0		

Potholes		Dust		Corrugations	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	10	0	10	0	10
1	9	1	8	1	9
2	7	2	6	2	7
3	5	3	2	3	7
4	7			4	6
5	4			5	5
6	3			6	5
7	4			7	4
8	2			8	3
9	0			9	0

Loose Aggregate	
Distress Rating	Remaining Service Life
0	10
1	9
2	8
3	7
4	8
5	7
6	6
7	5
8	3
9	0

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE IN YEARS (Gravel & Native Roads)

RSL	FAILED	POOR	FAIR	GOOD	EXCELLENT
	0	1 - 2	3 - 4	5 - 7	8 - 10